

WHAT IS CLAIMED IS:

1. An implantable medical device comprising:
a device body including a beneficial agent arranged for delivery from
the device body to an implantation site within a patient, the beneficial agent
5 configured to be selectively modulated after implantation within the patient by an
activating/deactivating means, wherein the beneficial agent at a first region of the
device body can be modulated by the activating/deactivating means to create a
different agent delivery profile than the beneficial agent at a second region of the
device body.
- 10 2. The device of Claim 1, wherein the beneficial agent is configured to
be modulated after implantation within the patient by the activating/deactivating
means in the form of an energy emitting catheter.
- 15 3. The device of Claim 1, wherein the beneficial agent is configured to
be modulated after implantation within the patient by the activating/deactivating
means in the form of a chemical agent.
- 20 4. The device of Claim 1, wherein the beneficial agent is substantially
uniformly distributed in the device body.
- 25 5. The device of Claim 1, comprising a barrier layer configured to be
acted on by the activating/deactivating means to release or retain the beneficial agent
in the first or second regions.
- 30 6. The device of Claim 1, wherein beneficial agent is contained in a
matrix or binder configured to be acted on by the activating/deactivating means to
release or retain the beneficial agent in the first or second regions.
7. The device of Claim 1, wherein the device body is a cylindrical,
expandable medical device.
8. The device of Claim 7, wherein the device is a stent.

9. The device of Claim 7, wherein the beneficial agent is contained in a plurality of recesses in the medical device.

10. The device of Claim 7, wherein the beneficial agent is containing in a 5 plurality of through holes in the medical device.

11. The device of Claim 1, wherein the beneficial agent is selected to treat vascular disease.

10 12. The device of Claim 1, wherein the beneficial agent is located in a plurality of openings in the device body.

13. A beneficial agent delivery system comprising:
an implantable medical device including a beneficial agent arranged 15 for delivery to an implantation site within a patient, the beneficial agent configured to be modulated after implantation within the patient by an activating/deactivating means; and
a selective modulation catheter having an activating/deactivating means configured to activate or deactivate the beneficial agent on a first region of 20 the medical device to create a different delivery profile than the beneficial agent on a second region of the medical device.

14. The beneficial agent delivery system of Claim 13, wherein the modulation catheter deactivates the beneficial agent on the first region of the 25 medical device by increasing the delivery period.

15. The beneficial agent delivery system of Claim 13, wherein the modulation catheter deactivates the beneficial agent on the first region of the medical device by blocking beneficial agent delivery.

30 16. The beneficial agent delivery system of Claim 13, wherein the modulation catheter deactivates the beneficial agent on a first region of the medical device by deactivating the agent.

17. The beneficial agent delivery system of Claim 13, wherein the modulation catheter activates the beneficial agent on a first region of the medical device by modulating the delivery period.

5 18. The beneficial agent delivery system of Claim 13, wherein the modulation catheter activates the beneficial agent on a first region of the medical device by releasing the beneficial agent.

10 19. The beneficial agent delivery system of Claim 13, wherein the selective modulation catheter includes an energy emitter which acts on the beneficial agent or the implantable medical device.

20 20. The beneficial agent delivery system of Claim 19, wherein the energy emitter emits light, ultrasonic energy, or radiation.

15 21. The beneficial agent delivery system of Claim 13, wherein the selective modulation catheter includes means for delivering a chemical agent which acts on the beneficial agent or the implantable medical device.

20 22. The beneficial agent delivery system of Claim 13, wherein the implantable medical device is a stent.

25 23. The beneficial agent delivery system of Claim 13, wherein the beneficial agent is located in a plurality of openings in the implantable medical device.

24. A method of beneficial agent delivery with selective modulation of beneficial agent delivery, the method comprising:

30 implanting an implantable medical device including a beneficial agent within a patient;

 delivering an activation/deactivation means to a location of the implanted medical device; and

35 modulating the amount of drug delivered from a first region of the implanted medical device with the activation/deactivation means without modulating the amount of beneficial agent delivered from a second region of the implanted medical device.

25. The method of Claim 24, wherein the beneficial agent is selected to treat vascular disease.

5 26. The method of Claim 24, wherein step of modulating is performed by selectively delivering energy to the first region of the implanted medical device.

10 27. The method of Claim 24, wherein the step of modulating is performed by selectively delivering a chemical to the first region of the implanted medical device.

28. The method of Claim 24, wherein the step of delivering an activation/deactivation means includes delivering a catheter containing the activation/deactivation means to the location of the implanted medical device.

15 29. The method of Claim 24, wherein the implantable medical device is a stent.

20 30. An beneficial agent delivery system comprising:
an expandable implantable stent;
a beneficial agent affixed to the stent, the beneficial agent having an initial agent release profile;
an activating/deactivating means, wherein the beneficial agent release profile can be modulated by the activating/deactivating means after implantation of
25 the stent within a patient to create an agent release profile different from the initial agent release profile.

30 31. The system of Claim 30, wherein the beneficial agent is configured to be modulated after implantation within the patient by the activating/deactivating means in the form of an energy emitting catheter.

35 32. The system of Claim 30, wherein the beneficial agent is configured to be modulated after implantation within the patient by the activating/deactivating means in the form of a chemical agent.

33. The system of Claim 30, wherein the beneficial agent is substantially uniformly distributed in the device body.

34. The system of Claim 30, comprising a barrier layer configured to be 5 acted on by the activating/deactivating means to create the different agent release profile.

35. The system of Claim 30, wherein beneficial agent is contained in a matrix or binder configured to be acted on by the activating/deactivating means to 10 release or retain the beneficial agent in the first or second regions.

36. The system of Claim 30, wherein the beneficial agent is contained in a plurality of recesses in the stent.

15 37. The system of Claim 30, wherein the beneficial agent is containing in a plurality of through holes in the stent.

38. The system of Claim 30, wherein the beneficial agent is selected to treat vascular disease.

20 39. The system of Claim 30, wherein the beneficial agent is configured for substantially no release until modulation by the activating/deactivating means.

40. The system of Claim 30, further comprising an additional beneficial 25 agent affixed to the stent and configured to be released without activation.

41. A method of beneficial agent delivery from a stent, the method comprising:

implanting a stent including a first beneficial agent and a second 30 beneficial agent within a lumen;
delivering the first beneficial agent from the stent;
determining whether the second beneficial agent is to be delivered;
delivering an activation means to the stent; and
modulating the amount of second beneficial agent delivered from the 35 stent with the activation means.

42. The method of Claim 41, wherein the delivery of the activation/deactivation means does not substantially modulating the amount of the first beneficial agent delivered from the stent.

5 43. The method of Claim 41, wherein the step of modulating is performed by delivering energy to the stent.

44. The method of Claim 41, wherein the step of modulating is performed by delivering a chemical to the stent.

10 45. A method of beneficial agent delivery from a stent, the method comprising:

implanting a stent including a first beneficial agent;
delivering the first beneficial agent from the stent;
15 determining when delivery of the first beneficial agent is to be terminated;
delivering a deactivation means to the stent; and
substantially terminating the amount of second beneficial agent delivered from the stent with the deactivation means.

20 46. The method of Claim 45, wherein the step of terminating is performed by delivering energy to the stent.

25 47. The method of Claim 45, wherein the step of terminating is performed by delivering a chemical to the stent.